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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
RAO, G NAGESH	

ART UNIT	PAPER NUMBER
1722	

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/799,335	TOMASINI ET AL.	
	Examiner	Art Unit .	
	G. Nagesh Rao	1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-43 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-43 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1) Claims 1-4, 6, 9-15, 19-28, 31-32, 34, 39-43 are rejected under 35 U.S.C. 102(e) as being anticipated by Murthy (US PG Pub 2003/0157787).

Examiner would like to point out that the claims filed by applicant are understood to be a mixture of process and product by process claims. Therefore the application will be treated on these merits when applicable.

Murthy 787 teaches a method including the blanket deposition of a SiGe film comprising of the intermixing of a silicon (Si) source, a germanium (Ge) source, and an etchant to form a gaseous precursor mixture under a CVD process, whereby the layering can occur as a blanket layer of the sorts. Examiner points out that in figure 5 as understood by the process diagram, the process begins with loading a wafer (i.e. substrate) into a CVD chamber, followed by introducing the Si source gas such as silane into the CVD chamber as well the etchant source gas such as HCl (etchant gas source flow continues throughout the deposition process),

and then decreasing the flow of Si flow while introducing the Ge gas source such as germane, thereby having an intermixing of all three gas sources simultaneously, and as can be explicitly shown in Figure 2 there is a Si Substrate (202), a buffer layer of SiGe (204), and a Ge or other film layer of the sorts (206) deposited over the buffer layer of SiGe which reads on as an epitaxial blanket layer deposited over the substrate which may be a monocrystalline semiconductor wafer (See Sections 0021-0026 and 0029).

Furthermore in another embodiment of Murthy 787 it is understood by the Figure 3 flow process diagram that a substrate can be placed in the CVD chamber for pre-processing where a dielectric mask (reading on dielectric material) such as SiO_2 a known type of oxide material, is positioned over the substrate and the brief introduction of Si source gas such as silane, and HCl (a commonly known type of etchant in semiconductor processing) therefore creating an initial pattern of the sort such as a shallow treanch isolation scheme as can be seen in figure 9a or 4b before the forming of the SiGe buffer layer over the patterned substrate and thereafter any other deposited film layers over the SiGe buffer layer and the patterned layer over the substrate which would read on as a type of underlying blanket layer (See Sections 0028-0034).

The varying embodiments of Murthy 787 teach various flow rates of the silicon, germanium, and etchant flow gas sources. These flow rates in their own right help determine the mass amount of the material presented into the CVD chamber system, as so described by applicant's specification on page 6. Therefore based on that statement, it is understood that the flow rates taught in Murthy 787 can be altered to achieve a mass amount where the combined Si and Ge gas sources weigh more than the etchant gas source. For example the flow of Si and Ge sources range from 0-200 sccm and 0-500 sccm respectively, whereas the HCl source flows in at about 50 sccm (which falls between the prescribed 1-200 and 25-50 sccm ranges for the etchant) (see Sections 0029-0030).

Furthermore the temperature ranges for the CVD process range from 625-700^0 C which fall within the range prescribed by applicant's claim of 350-1100^{0}C, and the pressure of the chamber is at 1 atm which is the equivalent of 760 torr.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2) Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murthy (US PG Pub 2003/0157787) in view of Mayer, J. and Lau, S.S. **Electronic Materials Science: For Integrated Circuits in Si andGaAs,** P. 40.

From the aforementioned Murthy 787 teaches a process for depositing SiGe buffer layer on a substrate. This process includes teaching the use of a dielectric material mask, in Murthy 787's case the use of SiO_2 a well known gate dielectric oxide. However Murthy 787 failed to teach an alternative well known gate dielectric nitride.

In a literature reference pertaining to electronic materials processing, Mayer and Lau teach that oxides and nitrides are equivalents in the gate dielectric field.

Therefore at the time of the invention it would have been obvious to one having ordinary skill in the art to modify the teachings of Murthy 787 with that of

Mayer and Lau, to realize that using a nitride in lieu of oxide as the dielectric material as a substitution of equivalents.

3) Claims 7-8, 16-18, 29-30, 33, and 35-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murthy (US PG Pub 2003/0157787) in view of applicant's admitted statements of prior known states of the art via routine experimentation on page 6 of the specification.

From the aforementioned Murthy 787 teaches a process for depositing SiGe buffer layer on a substrate. This process includes teaching the use of varying deposition, gas flow source, etchant source, CVD, temperature, and pressure variation standards. As admitted by applicant these processes utilized to obtain specified surface roughness values and conditions imposed on the system are the result of routine experimentation.

Therefore it would be obvious to one having ordinary skill in the art at the time of the invention to implement varying conditions as set forth by the system and process taught by Murthy 787 to include routine experimentation in order to optimize the process and system. Through optimization of these procedures allows for better control and better product quality when fabricating the SiGe film layer. It is also understood and well known that these product characteristics are directly

related to pressure, temperature, and material flow parameters, and therefore further substantiates that these claims would be obvious in light of routine experimentation to achieve desired results. Any inquiry concerning this communication or earlier communications from the examiner should be directed to G. Nagesh Rao whose telephone number is (571) 272-2946. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571)272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GNR

Robert Kunemund
Patent Examiner
TC 1700